

SEQUENCE LISTING

<110> CASTANIA Sociedade Agroflorestal SA

<120> Castanea sativa Mill. genes codifying for Allene Oxide Cyclase, Cystatin, β -1,3-Glucanase and Thaumatin-Like Protein and their use

<130> 1

<140>

<141> 2004-06-07

<150> PT 102979-S

<151> 2003-06-26

<160> 8

<170> PatentIn version 3.1

<210> 1

<211> 735

<212> DNA

<213> Castanea sativa

<400> 1

atg gcc act gtt tcc tca gcc tct gct gct ctt aga acc att tct tct	48
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tcc tca tcc aag cta tct tct gcc ttc caa act aaa aag atc caa tct	96
Ser Ser Ser Lys Leu Ser Ser Ala Phe Gln Thr Lys Lys Ile Gln Ser	
20 25 30	
ttt aaa cta cct aac cct ctc att tct cag aat cat aaa ctt act acc	144

Phe	Lys	Leu	Pro	Asn	Pro	Leu	Ile	Ser	Gln	Asn	His	Lys	Leu	Thr	Thr		
		35					40					45					
acc	tct	act	act	gct	tcc	aga	tca	ttt	tcc	tgc	aag	agc	cag	agc	acc		192
Thr	Ser	Thr	Thr	Ala	Ser	Arg	Ser	Phe	Ser	Cys	Lys	Ser	Gln	Ser	Thr		
		50				55					60						
tca	aca	gat	tca	act	aac	act	gaa	gtt	caa	gaa	ctt	agt	gtc	tat	gag		240
Ser	Thr	Asp	Ser	Thr	Asn	Thr	Glu	Val	Gln	Glu	Leu	Ser	Val	Tyr	Glu		
		65			70				75						80		
atc	aat	gaa	cgt	gat	cgt	gga	agc	cct	gct	tat	ctt	cga	ttg	agc	caa		288
Ile	Asn	Glu	Arg	Asp	Arg	Gly	Ser	Pro	Ala	Tyr	Leu	Arg	Leu	Ser	Gln		
				85					90					95			
aag	act	gtt	aat	tca	ctc	gga	gat	ctt	gtc	ccc	ttt	agc	aac	aag	cta		336
Lys	Thr	Val	Asn	Ser	Leu	Gly	Asp	Leu	Val	Pro	Phe	Ser	Asn	Lys	Leu		
			100					105					110				
tat	act	gca	gat	cta	aag	aag	aga	att	gga	ata	aca	gca	gga	ctc	tgc		384
Tyr	Thr	Ala	Asp	Leu	Lys	Lys	Arg	Ile	Gly	Ile	Thr	Ala	Gly	Leu	Cys		
		115					120					125					
att	ctg	atc	aag	cac	gaa	gaa	gag	aag	aaa	gga	gat	cgc	tat	gaa	gct		432
Ile	Leu	Ile	Lys	His	Glu	Glu	Glu	Lys	Lys	Gly	Asp	Arg	Tyr	Glu	Ala		
		130				135					140						
gtt	tac	agc	ttc	tac	ttc	ggc	gat	tac	ggg	cat	atc	gcc	gtt	cag	gga		480
Val	Tyr	Ser	Phe	Tyr	Phe	Gly	Asp	Tyr	Gly	His	Ile	Ala	Val	Gln	Gly		
		145			150					155					160		
gcg	tac	tta	acc	tat	gaa	gaa	act	tac	cta	gcc	gtc	acc	ggg	gga	tcc		528
Ala	Tyr	Leu	Thr	Tyr	Glu	Glu	Thr	Tyr	Leu	Ala	Val	Thr	Gly	Gly	Ser		
				165					170					175			
ggc	ata	ttt	gca	ggg	gtt	tcc	ggg	caa	gtg	aaa	ttg	cag	caa	ctc	att		576
Gly	Ile	Phe	Ala	Gly	Val	Ser	Gly	Gln	Val	Lys	Leu	Gln	Gln	Leu	Ile		
			180					185					190				
ttc	cct	ttc	aag	cta	ttt	tac	act	ttt	tac	ttg	aag	ggg	atc	ccc	ggg		624
Phe	Pro	Phe	Lys	Leu	Phe	Tyr	Thr	Phe	Tyr	Leu	Lys	Gly	Ile	Pro	Gly		
			195				200					205					
ctg	cca	tct	gaa	ttg	ttg	tgt	acg	gcg	gtt	cct	ccg	tcg	ccg	acg	gtg		672
Leu	Pro	Ser	Glu	Leu	Leu	Cys	Thr	Ala	Val	Pro	Pro	Ser	Pro	Thr	Val		
		210				215					220						
gag	cca	aca	cct	gaa	gct	aaa	gct	tgt	gag	gaa	ggg	gcc	gca	ctg	aaa		720
Glu	Pro	Thr	Pro	Glu	Ala	Lys	Ala	Cys	Glu	Glu	Gly	Ala	Ala	Leu	Lys		
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aat	tac	act	aat	taa													735
Asn	Tyr	Thr	Asn														

<210> 2

<211> 244

<212> PRT

<213> Castanea sativa

<400> 2

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Phe Lys Leu Pro Asn Pro Leu Ile Ser Gln Asn His Lys Leu Thr Thr
35 40 45

Thr Ser Thr Thr Ala Ser Arg Ser Phe Ser Cys Lys Ser Gln Ser Thr
50 55 60

Ser Thr Asp Ser Thr Asn Thr Glu Val Gln Glu Leu Ser Val Tyr Glu
65 70 75 80

Ile Asn Glu Arg Asp Arg Gly Ser Pro Ala Tyr Leu Arg Leu Ser Gln
85 90 95

Lys Thr Val Asn Ser Leu Gly Asp Leu Val Pro Phe Ser Asn Lys Leu
100 105 110

Tyr Thr Ala Asp Leu Lys Lys Arg Ile Gly Ile Thr Ala Gly Leu Cys
115 120 125

Ile Leu Ile Lys His Glu Glu Glu Lys Lys Gly Asp Arg Tyr Glu Ala
130 135 140

Val Tyr Ser Phe Tyr Phe Gly Asp Tyr Gly His Ile Ala Val Gln Gly
145 150 155 160

Ala Tyr Leu Thr Tyr Glu Glu Thr Tyr Leu Ala Val Thr Gly Gly Ser
165 170 175

Gly Ile Phe Ala Gly Val Ser Gly Gln Val Lys Leu Gln Gln Leu Ile
180 185 190

Phe Pro Phe Lys Leu Phe Tyr Thr Phe Tyr Leu Lys Gly Ile Pro Gly
 195 200 205

Leu Pro Ser Glu Leu Leu Cys Thr Ala Val Pro Pro Ser Pro Thr Val
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Glu Pro Thr Pro Glu Ala Lys Ala Cys Glu Glu Gly Ala Ala Leu Lys
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Asn Tyr Thr Asn

<210> 3

<211> 318

<212> DNA

<213> Castanea sativa

<400> 3

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 Met Arg Lys Leu Ala Ala Leu Val Gly Gly Val Ser Asp Val Lys Gly
 1 5 10 15

cat gag aac agc ttg cag atc gac gac ctc gct cgt ttt gct gtc gac 96
 His Glu Asn Ser Leu Gln Ile Asp Asp Leu Ala Arg Phe Ala Val Asp
 20 25 30

gac cac aac aag aaa gcg aat aca ctg ctg cag ttt aag aag gtg gtg 144
 Asp His Asn Lys Lys Ala Asn Thr Leu Leu Gln Phe Lys Lys Val Val
 35 40 45

aat gcg aaa cag cag gtg gtt tct gga aca ata tac att cta acg ttg 192
 Asn Ala Lys Gln Gln Val Val Ser Gly Thr Ile Tyr Ile Leu Thr Leu
 50 55 60

gag gtg gag gat ggc ggg aag aag aaa gtt tat gaa gcc aag att tgg 240
 Glu Val Glu Asp Gly Gly Lys Lys Lys Val Tyr Glu Ala Lys Ile Trp
 65 70 75 80

gag aag cca tgg ttg aac ttc aag gag gtg cag gaa ttt aag ctc att 288
 Glu Lys Pro Trp Leu Asn Phe Lys Glu Val Gln Glu Phe Lys Leu Ile
 85 90 95

ggt gat gcc cct aca cac cat agt gct taa 318
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<210> 4

<211> 105

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<213> Castanea sativa

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His Glu Asn Ser Leu Gln Ile Asp Asp Leu Ala Arg Phe Ala Val Asp
20 25 30

Asp His Asn Lys Lys Ala Asn Thr Leu Leu Gln Phe Lys Lys Val Val
35 40 45

Asn Ala Lys Gln Gln Val Val Ser Gly Thr Ile Tyr Ile Leu Thr Leu
50 55 60

Glu Val Glu Asp Gly Gly Lys Lys Lys Val Tyr Glu Ala Lys Ile Trp
65 70 75 80

Glu Lys Pro Trp Leu Asn Phe Lys Glu Val Gln Glu Phe Lys Leu Ile
85 90 95

Gly Asp Ala Pro Thr His His Ser Ala
100 105

<210> 5

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<212> DNA

<213> Castanea sativa

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tct aac att gaa gtc atg cta ggt gtc cca aac tca gac ctt caa agc	Ser Asn Ile Glu Val Met Leu Gly Val Pro Asn Ser Asp Leu Gln Ser	96		
	20 25 30			
ctt gcc aac cct tcc aat gca caa gca tgg gta caa aga aac gta ctt	Leu Ala Asn Pro Ser Asn Ala Gln Ala Trp Val Gln Arg Asn Val Leu	144		
	35 40 45			
aac ttc tgg cct agt gtc agg ttt cga tac att gca gtt gga aat gaa	Asn Phe Trp Pro Ser Val Arg Phe Arg Tyr Ile Ala Val Gly Asn Glu	192		
	50 55 60			
gtg agt cct gtt aat gga ggc aca gct ggg tta gca caa att gtt ctc	Val Ser Pro Val Asn Gly Gly Thr Ala Gly Leu Ala Gln Ile Val Leu	240		
	65 70 75 80			
cct gcc tta acc aac gta ttc aat gca att aga tca gct ggc ctt aag	Pro Ala Leu Thr Asn Val Phe Asn Ala Ile Arg Ser Ala Gly Leu Lys	288		
	85 90 95			
gac caa atc cag gtt tca att gca att gac atg acc tta ata gga aac	Asp Gln Ile Gln Val Ser Ile Ala Ile Asp Met Thr Leu Ile Gly Asn	336		
	100 105 110			
tcc tat cct ccg tca gca ggg gct ttc aga ggt gat gtt aga tca tat	Ser Tyr Pro Pro Ser Ala Gly Ala Phe Arg Gly Asp Val Arg Ser Tyr	384		
	115 120 125			
tta gac cca atc att ggt cac cta gta tat gct aag gca ccc tta cta	Leu Asp Pro Ile Ile Gly His Leu Val Tyr Ala Lys Ala Pro Leu Leu	432		
	130 135 140			
gcc aat gtg tac act tat ttt agc tat gct gga aat cca cgc gac att	Ala Asn Val Tyr Thr Tyr Phe Ser Tyr Ala Gly Asn Pro Arg Asp Ile	480		
	145 150 155 160			
tct ctt ccc tat gct ttg ttt act tcc cca tca gtt gtg gca tgg gat	Ser Leu Pro Tyr Ala Leu Phe Thr Ser Pro Ser Val Val Ala Trp Asp	528		
	165 170 175			
ggc cct aag gga tac caa aac ctt ttt gat gca atg atg gat gca ttg	Gly Pro Lys Gly Tyr Gln Asn Leu Phe Asp Ala Met Met Asp Ala Leu	576		
	180 185 190			
tac tca gct ctc gag agg tcg tgg ggc ggt tca ttg gag gtt gtt gtt	Tyr Ser Ala Leu Glu Arg Ser Trp Gly Gly Ser Leu Glu Val Val Val	624		
	195 200 205			
tca gag agt gga tgg cca tca gca gca ggt gga ttc gct aca tca ttt	Ser Glu Ser Gly Trp Pro Ser Ala Ala Gly Gly Phe Ala Thr Ser Phe	672		
	210 215 220			
gat aat gca cgt act tat tac tca aat ttg att aag cat gtc aaa ggg	Asp Asn Ala Arg Thr Tyr Tyr Ser Asn Leu Ile Lys His Val Lys Gly	720		
	225 230 235 240			

ggt	aca	cca	aag	agg	cct	ggg	gga	gct	ata	gag	acc	tat	ctt	ttt	gcc	768
Gly	Thr	Pro	Lys	Arg	Pro	Gly	Gly	Ala	Ile	Glu	Thr	Tyr	Leu	Phe	Ala	
				245					250					255		

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Met	Phe	Asn	Glu	Asn	Gln	Lys	Gln	Pro	Glu	Leu	Glu	Lys	Asn	Phe	Gly	
			260					265					270			

tta	ttc	ttc	cca	aat	aaa	cag	ccc	aaa	ttt	aac	ctc	aat	ttt	ggt	gga	864
Leu	Phe	Phe	Pro	Asn	Lys	Gln	Pro	Lys	Phe	Asn	Leu	Asn	Phe	Gly	Gly	
		275					280					285				

gaa	aga	atc	tgg	gat	gtc	act	gct	gaa	tat	aat	gca	aca	ggt	tcc	ctc	912
Glu	Arg	Ile	Trp	Asp	Val	Thr	Ala	Glu	Tyr	Asn	Ala	Thr	Val	Ser	Leu	
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agt	agt	gat	atg	taa												927
Ser	Ser	Asp	Met													
305																

<210> 6

<211> 308

<212> PRT

<213> Castanea sativa

<400> 6

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Ser	Asn	Ile	Glu	Val	Met	Leu	Gly	Val	Pro	Asn	Ser	Asp	Leu	Gln	Ser
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Leu	Ala	Asn	Pro	Ser	Asn	Ala	Gln	Ala	Trp	Val	Gln	Arg	Asn	Val	Leu
	35						40					45			

Asn	Phe	Trp	Pro	Ser	Val	Arg	Phe	Arg	Tyr	Ile	Ala	Val	Gly	Asn	Glu
	50					55					60				

Val	Ser	Pro	Val	Asn	Gly	Gly	Thr	Ala	Gly	Leu	Ala	Gln	Ile	Val	Leu
65				70						75					80

Pro	Ala	Leu	Thr	Asn	Val	Phe	Asn	Ala	Ile	Arg	Ser	Ala	Gly	Leu	Lys
				85					90					95	

Asp Gln Ile Gln Val Ser Ile Ala Ile Asp Met Thr Leu Ile Gly Asn
100 105 110

Ser Tyr Pro Pro Ser Ala Gly Ala Phe Arg Gly Asp Val Arg Ser Tyr
115 120 125

Leu Asp Pro Ile Ile Gly His Leu Val Tyr Ala Lys Ala Pro Leu Leu
130 135 140

Ala Asn Val Tyr Thr Tyr Phe Ser Tyr Ala Gly Asn Pro Arg Asp Ile
145 150 155 160

Ser Leu Pro Tyr Ala Leu Phe Thr Ser Pro Ser Val Val Ala Trp Asp
165 170 175

Gly Pro Lys Gly Tyr Gln Asn Leu Phe Asp Ala Met Met Asp Ala Leu
180 185 190

Tyr Ser Ala Leu Glu Arg Ser Trp Gly Gly Ser Leu Glu Val Val Val
195 200 205

Ser Glu Ser Gly Trp Pro Ser Ala Ala Gly Gly Phe Ala Thr Ser Phe
210 215 220

Asp Asn Ala Arg Thr Tyr Tyr Ser Asn Leu Ile Lys His Val Lys Gly
225 230 235 240

Gly Thr Pro Lys Arg Pro Gly Gly Ala Ile Glu Thr Tyr Leu Phe Ala
245 250 255

Met Phe Asn Glu Asn Gln Lys Gln Pro Glu Leu Glu Lys Asn Phe Gly
260 265 270

Leu Phe Phe Pro Asn Lys Gln Pro Lys Phe Asn Leu Asn Phe Gly Gly
275 280 285

Glu Arg Ile Trp Asp Val Thr Ala Glu Tyr Asn Ala Thr Val Ser Leu
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Ser Ser Asp Met
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<210> 7

<211> 732

<212> DNA

<213> Castanea sativa

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tct ggt gca cac tct gct aaa ata act ttc aca aac aac tgt cca aga	96
Ser Gly Ala His Ser Ala Lys Ile Thr Phe Thr Asn Asn Cys Pro Arg	
20 25 30	
acc atc tgg cca gga acc cta act tcg gat caa aaa cct caa ctt tca	144
Thr Ile Trp Pro Gly Thr Leu Thr Ser Asp Gln Lys Pro Gln Leu Ser	
35 40 45	
aaa act gga ttt gag tta gca tcc aaa gca tcc tta aca ttg gaa tgt	192
Lys Thr Gly Phe Glu Leu Ala Ser Lys Ala Ser Leu Thr Leu Glu Cys	
50 55 60	
tca agc tcc atg gaa agg ccg gtt ttg ggc ccg aac ccg atg cac cac	240
Ser Ser Ser Met Glu Arg Pro Val Leu Gly Pro Asn Pro Met His His	
65 70 75 80	
caa atc agg aaa gtt cac ttg cga gac tgc tga ttg tag cac cgg tca	288
Gln Ile Arg Lys Val His Leu Arg Asp Cys Leu His Arg Ser	
85 90	
ggt tgc atg caa tgg taa ccg tgc aat ccc acc agc ttc ttt agt aga	336
Gly Cys Met Gln Trp Arg Cys Asn Pro Thr Ser Phe Phe Ser Arg	
95 100 105	
aat caa cat agc agc caa tcg tgg gat gga cta tta tga tgt tag cct	384
Asn Gln His Ser Ser Gln Ser Trp Asp Gly Leu Leu Cys Pro	
110 115 120	
tgt aga tgg ctt caa ctt gcc tgt ttc tgt agc cac cag agg cgg cac	432
Cys Arg Trp Leu Gln Leu Ala Cys Phe Cys Ser His Gln Arg Arg His	
125 130 135	
tgg tga ttg caa ggc cac aag ctg tcc agc taa tgt gaa cgc agt ttg	480
Trp Leu Gln Gly His Lys Leu Ser Ser Cys Glu Arg Ser Leu	
140 145 150	
ccc agc gga att aca agt gaa agg gtc tga tgg gag cgt gct tgc ttg	528
Pro Ser Gly Ile Thr Ser Glu Arg Val Trp Glu Arg Ala Cys Leu	
155 160 165	
caa gag cgc ttg tat tgc ttt caa tca acc aca gta ctg ttg cac tgg	576

Gln	Glu	Arg	Leu	Tyr	Cys	Phe	Gln	Ser	Thr	Thr	Val	Leu	Leu	His	Trp		
170						175					180						
tgc	att	taa	cac	ccc	gaa	aac	atg	tcc	acc	cac	aaa	ata	ttc	tcg	cat	624	
Cys	Ile		His	Pro	Glu	Asn	Met	Ser	Thr	His	Lys	Ile	Phe	Ser	His		
185						190					195						
ctt	taa	gca	aca	atg	tcc	tca	agc	tta	tag	cta	tgc	tta	tga	tga	tcc	672	
Leu		Ala	Thr	Met	Ser	Ser	Ser	Leu		Leu	Cys	Leu			Ser		
200						205						210					
tac	cag	cac	ctt	tac	ctg	ctc	aag	tgc	acc	cga	cta	tgt	tat	cgc	att	720	
Tyr	Gln	His	Leu	Tyr	Leu	Leu	Lys	Cys	Thr	Arg	Leu	Cys	Tyr	Arg	Ile		
			215					220					225				
ttg	tcc	ata	aat													732	
Leu	Ser	Ile	Asn														
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<210> 8

<211> 226

<212> PRT

<213> Castanea sativa

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Met	Lys	Thr	Leu	Ala	Leu	Tyr	Gly	Leu	Thr	Leu	Ala	Phe	Phe	Phe	Leu		
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Ser	Gly	Ala	His	Ser	Ala	Lys	Ile	Thr	Phe	Thr	Asn	Asn	Cys	Pro	Arg		
			20					25					30				
Thr	Ile	Trp	Pro	Gly	Thr	Leu	Thr	Ser	Asp	Gln	Lys	Pro	Gln	Leu	Ser		
		35					40					45					
Lys	Thr	Gly	Phe	Glu	Leu	Ala	Ser	Lys	Ala	Ser	Leu	Thr	Leu	Glu	Cys		
	50					55					60						
Ser	Ser	Ser	Met	Glu	Arg	Pro	Val	Leu	Gly	Pro	Asn	Pro	Met	His	His		
65					70					75					80		
Gln	Ile	Arg	Lys	Val	His	Leu	Arg	Asp	Cys	His	Arg	Ser	Gly	Cys	Met	Gln	
				85					90								
Trp	Arg	Cys	Asn	Pro	Thr	Ser	Phe	Phe	Ser	Arg	Asn	Gln	His	Ser	Ser	Gln	

100

105

110

Ser Trp Asp Gly Leu Leu Pro Cys Arg Trp Leu Gln Leu Ala Cys Phe Cys
115 120 125 130

Ser His Gln Arg Arg His Trp Leu Gln Gly His Lys Leu Ser Ser Cys Glu
135 140 145

Arg Ser Leu Pro Ser Gly Ile Thr Ser Glu Arg Val Trp Glu Arg Ala Cys
150 155 160 165

Leu Gln Glu Arg Leu Tyr Cys Phe Gln Ser Thr Thr Val Leu Leu His Trp
170 175 180

Cys Ile His Pro Glu Asn Met Ser Thr His Lys Ile Phe Ser His Leu Ala
185 190 195

Thr Met Ser Ser Ser Leu Ser Tyr Gln His Leu Tyr Leu Leu Lys Cys Thr
200 205 210 215

Arg Leu Cys Tyr Arg Ile Leu Ser Ile Asn
220 225